

Is the allegation that there is a mathematical error in Quran's allocation of inheritance. The allegation is that when a man dies leaving three daughters, one wife, one mother and one father the shares Quran gives exceeds 1 and hence there is a mathematical error.

The shares according to Quran are:

$\frac{2}{3}$ daughters, $\frac{1}{6}$ mother, $\frac{1}{6}$ father, $\frac{1}{8}$ wife

If these fractions are added, the sum is 1.25 instead of 1 which is a mistake. No inheritance would exist to distribute among these stated above candidates.

Some have suggested that the denominators of these shares should be equalized and new shares should be created accordingly (the so-called AVL method). When it is equalized the denominator (for example when we make 24 denominator for each) we get $\frac{16}{24}$, $\frac{4}{24}$, $\frac{4}{24}$, $\frac{3}{24}$.

Some suggest that we then neglect the denominator and solve for X in $16X + 4X + 4X + 3X = \text{Total Inheritance}$. If inheritance is 27 golds, for example, then three daughters would get 16, mother would get 4, father would get 4, and wife would get 3. This may be a pragmatic solution, we are kind of changing the Quranic formula a somewhat arbitrarily. For example, we are giving three daughters 16 whereas they should get 18 because the verse clearly and literally states that three daughters should get $\frac{2}{3}$ of the total inheritance. $\frac{2}{3}$ of 27 should have been 18. Above all, the Quran is giving shares with respect to the whole inheritance and to analyze the shares with respect to each other has no linguistic Quranic background

Answer

This allegation is based on some misconceptions. These are of two types, Religious and Mathematical.

First one should deal with the Mathematical type of Problem.

It is a simple case of splitting or dividing a given number into 4 parts in a Ratio of 4-Terms or a 4-Term Ratio.

If p is any Positive Real Number, $p > 0$, and there is a given Ratio.

Let the number be p. It is to be divided into three parts in the ratio $a : b : c : d$

Where a,b,c,d are Rational Numbers in the simplest form of $\frac{p}{q} > 0$, $q \neq 0$

Let the parts be u, x, y and z. Then, $u + x + y + z = p$ (i)

and $u = ak$, $x = bk$, $y = ck$, $z = dk$ (ii)

Substituting in (i), $ak + bk + ck + dk = p$

$$\Rightarrow k(a + b + c + d) = p$$

Therefore, $k = p/(a+b+c+d)$

Where $(a+b+c+d) = m$

Where $m > 0$, m is a Rational Positive, $m > 0$.

The above solution is valid in the following cases.

- i) $0 < m < 1$
- ii) $m = 1$
- iii) $1 < m$

Where $m > 0$ is an Integer.

Therefore,

$$u = (ap)/(a+b+c+d)$$

$$x = (bp)/(a+b+c+d)$$

$$y = (cp)/(a+b+c+d)$$

$$z = (dp)/(a+b+c+d)$$

. The shares according to Quran are:

2/3 daughters, 1/6 mother, 1/6 father, 1/8 wife

The Quranic Ratios are as follow:

$$1/8 : 1/6 : 1/6 : 2/3$$

If these terms are added the sum is greater than 0, hence under the given conditions solution does exist.

There is no Mathematical Condition that the sum must be equal to 1.

The Sum is $1.25 > 1$ which not a Mathematical problem. Solution of inheritance does exist to distribute to all these people, since the above formulae are applicable.

2nd Preliminary

The LCM 24 is not stated in the Sacred Text, rather is a part of Mathematical Solution. As not prescribed in the Sacred Text, LCM may change according to the problem of inheritance.

The Fallacies.

- 1) In ancient times it was thought that no Mathematical solution exists in the case the Sum of the terms of the Ratio is greater than 1 . But Mathematical Solutions do exist in such cases.
- 2) The LCM is 24 is neither stated in Sacred Qur'a:n nor prescribed in Sacred Qur'a:n. So if in a solution the LCM is not 24 , this does not imply that this is a violation of Divine Text or a number prescribed in Divine Text. Hence it is strictly in accordance to the prescribed fractions.
- 3) It is a fallacy to assume that the LCM must be equal to 24 in all cases . It may be different depending on the condition whether the Sum of the Prescribed Fraction is greater than 1 or equal to 1 or less than 1 and greater than 0 .
- 4) There is no change in the fractions used as terms of a 4 term Ratio. The rest is the solution of Mathematics and the Solution is not the Part of the Sacred Text.
- 5) Denominator is not the issue. 24 is not stated in the Divine Text , rather it is found by Mathematics when the sum of terms of the 4 term Ratio is not greater than 1.
- 6) Consider the problem by another method.
If p is any number stated above, and x is any variable then:-
 $x(1/8)+x(1/6)+x(1/6)+x(2/3) = p$. This is Algebraic Method , and correct approach , regardless of any answer/ answers.
- 7) The objection that the denominator is neglected is invalid and incorrect since:- a) It is not prescribed in the Divine Text . b) It is not in the solution , when the Sum of the terms of 4-term Ratio is greater than 1 . c) The If the Sum of the Terms of the Ratio is less than 1 or equal to 1, the number 24 may be obtained as LCM during the Mathematical solution and not as a prescribed number. So there is no Error nether in Mathematical Solution nor In Sacred Text , if the number 24 is not obtained in the Mathematical Solution. d) Neglecting the denominator 24 , if it would be an Error the it would be a Mathematical Error and not an Error of Divine Text.

Third Preliminary:-

It may be noted that in ancient times when Mathematics was not developed ,it might have been considered as an error. But its solutions exist and this proves that there is no Mathematical Error. Since if a Mathematical Solution exists this proves with Mathematical Certainty that there is no Mathematical Error.

When this problem occurred Companions of Prophet did tried to find some Mathematical Method to solve the problem when the Sum of Terms of Ratio is greater than 1.The did neither say that there is no Mathematical Solution Possible nor say that there is no Mathematical Solution which exists.

This is just like the case of the solution equation :-

$$((x)^2) + 1 = 0$$

When this equation was attempted to be solved , it was found that there is no solution in Real Numbers. But Mathematicians did not claim that there is no Mathematical Solution of this Equation. Instead the find Imaginary Numbers

and then Complex Numbers , thus finding a not only just Solution but also finding Imaginary and Complex Numbers.